

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11)

EP 0 908 294 A2



(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.04.1999 Bulletin 1999/15

(51) Int Cl. 6: B29D 5/00, B31B 19/90,
B65D 33/25

(21) Application number: 98308050.8

(22) Date of filing: 02.10.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 06.10.1997 US 944480

(71) Applicant: ILLINOIS TOOL WORKS INC.
Glenview, Illinois 60025 (US)

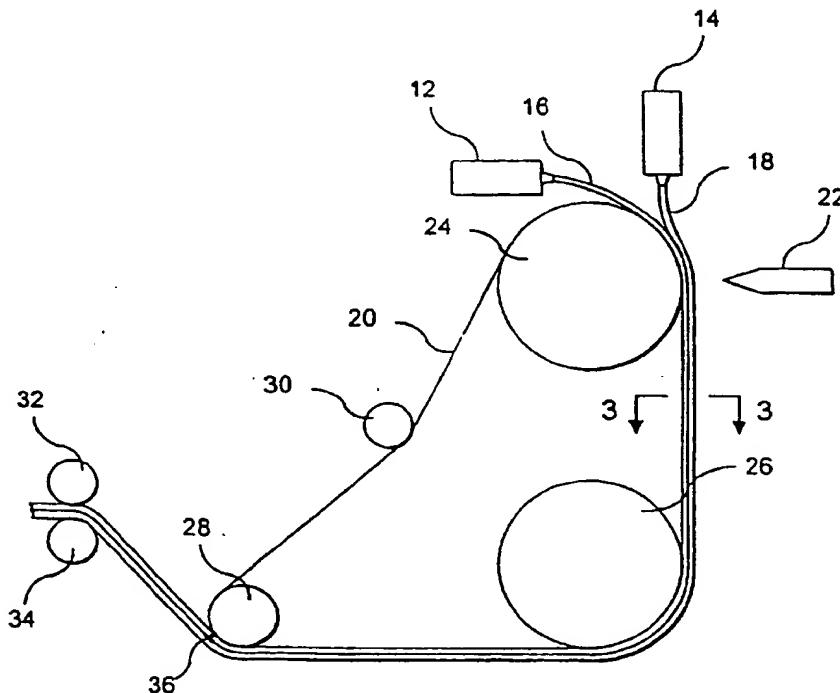
(72) Inventor: Plourde, Eric P.
Tinley Park, Illinois 60477 (US)

(74) Representative: Rackham, Stephen Neil
GILL JENNINGS & EVERY,
Broadgate House,
7 Eldon Street
London EC2M 7LH (GB)

(54) Zipper component

(57) An zipper component is formed by extruding a flange (16) and depositing it onto the top surface of a continuous carrier web (20), extruding a profile (18,18')

and, depositing it onto the top surface of the flange (16), cooling the flange (16) and profile (18,18') and stripping the flange (16) and profile (18,18') from the carrier web for further processing.



F I G. 2

EP 0 908 294 A2

Description

[0001] This invention relates to a zipper component tape or strip for resealable plastic bags and the like and a method for forming the zipper component. More particularly, this invention relates to a zipper component wherein a continuous molten stream of thermoplastic material is extruded.

[0002] In known processes for forming extruded zipper profiles for resealable plastic bags such as that described in US-A-4,741,789, a base member is extruded and deposited onto a bag film web. A profile member is thereafter extruded and deposited onto the base member, thus adhering the profile to the bag film web. Because the profile and base members are deposited directly onto the bag film web immediately after extrusion, the bag film web must be of such a material and configuration as to be subjected to the disclosed process. Thus, the effectiveness of such processes is limited. US-A-4,894,975 discloses a method of manufacturing reclosable plastic bags in a vertical form and seal machine wherein a strip or tape carrying the profiles is used to provide the closure for the bag and to complete the bag formation.

[0003] US-A-5,188,461 describes a method of manufacturing profile portions for packings, wherein the profiled portion is not deposited directly onto the packing. According to the method disclosed, a profiled outer layer is secured to an intermediate binding layer, which is secured to a base layer. The base layer is preferably made of the same material as the packing, allowing the base layer to be secured to the packing. By requiring the foregoing three layers, the disclosed method is not cost effective.

[0004] Other known methods of forming zipper components have used the extruded profile to pull itself through the equipment for manufacturing the same. To minimize deformation of the extruded profile due to tensile forces created in such methods, it is necessary to cool and solidify the extrudate as quickly as possible after extrusion. Water baths and cooled air have been utilized to cool and solidify the extrudate. However, such quenching methods do not permit typical post-extrusion forming of the extrudate. Further, such quenching methods do not eliminate deformation of relatively small unsupported profiles by tensile forces caused by the manufacturing equipment.

[0005] According to this invention a method of forming a zipper component comprises

extruding at least one profile;
depositing said at least one profile onto a top surface of a carrier web, said carrier web being formed in an endless loop;
stripping said at least one profile from said carrier web after said at least one profile has set.

[0006] Preferably the method comprises the further

steps of

extruding a flange prior to extruding said at least one profile; and,

depositing said flange directly onto said top surface of said carrier web;
wherein said at least one profile is then deposited onto a top surface of said flange.

[0007] A particular embodiment in accordance with this invention will now be described with reference to the accompanying drawings; in which:-

Figure 1 is a block diagram of the method according to the present invention;

Figure 2 is a side elevational view of an apparatus employing the method according to the present invention; and,

Figure 3 is a section view taken along reference lines 3-3 of Figure 2.

[0008] Figure 1 illustrates a block diagram of the method of forming a zipper component in accordance with the present invention, and Figure 2 illustrates an apparatus 10 for forming a zipper component according to the method of the present invention. First, in step 100, a flange 16 is extruded by a flange die 12. Next, in step 102, a profile 18 is extruded by a profile die 14. Preferably, flange 16 and profile 18 are each made of a polymeric resin. Depending upon the intended application of flange 16 and profile 18, it may be preferably to select differing materials for flange 16 and profile 18.

[0009] Next, in step 104, flange 16 is deposited onto the top surface of a continuous carrier web 20 in the area of carrier web 20 generally supported by cast roller 24. A sealant material may be co-extruded onto one or both surfaces of flange 16 before depositing flange 16 onto carrier web 20, or a sealant material may be extruded onto the upper surface of flange 16 after depositing flange 16 onto carrier web 20 prior to depositing profile 18 onto flange 16 as described below. Carrier web 20 forms an endless loop around cast roller 24, driving roller 26 and stripping roller 28 and is driven by driving roller 26. Driving roller 26 is driven by an electric motor or other driving means, not shown. Adjusting/steering roller 30 is provided between stripping roller 28 and cast roller 24 to adjust and maintain the tension of carrier web 20. Carrier web 20 may be made of a suitable material, such as Teflon, to which flange 16 will not adhere or conditioned to prevent adherence or slippage. The top surface of carrier web 20 may have a texture 38, as imparted to the flange 16 to increase the capability of flange 16 to bond to a substrate in such intended applications as recloseable plastic bags. By imparting a grid-like structure to the surface of flange 16 and bonding flange 16 to a substrate, fluid leaks between the bonded surface of flange 16 and the substrate are minimized or eliminated, requiring such fluids to follow a tortuous

path.

path to subtend the bonded flange 16. At least the top surface of carrier web 20 may also have a treatment to provide adequate adhesion so that flange 16 does not intermittently slip and reattach to carrier web 20 and to allow release of flange 16 at the stripping point 36 as described below. The treatment may consist of raising or lowering the temperature of carrier web 20 at specific points to facilitate such adhesion and detachment, or the treatment may be a release agent being applied to the top surface of carrier web 20 prior to depositing flange 16 thereon.

[0010] Next, in step 106, profile 18 is deposited onto the top surface of flange 16 or onto the top surface of the sealant material if a sealant material is co-extruded onto the top surface of flange 16 as described above. While the material selected for flange 16 may differ from the material selected for profile 18, the materials selected should permit profile 18 to bond with flange 16 and permit flange 16 to bond with the substrate. Obviously, numerous shapes are available for profile 18, and only a representative shape is depicted. Next, in step 108, flange 16 and profile 18 are cooled by adjusting/cooling nozzle 22, thereby stabilizing and setting flange 16 and profile 18. Water may be ejected from adjusting/cooling nozzle 22 to cool flange 16 and profile 18. As illustrated in Figure 2, carrier web 20 is disposed vertically between cast roller 24 and driving roller 26, which ensures that any water deposited on flange 16 and/or profile 18 during forces are imparted on flange 16 or profile 18 to guide flange 16 and profile 18 through the apparatus 10. Thus, deformation of flange 16 and profile 18, even when flange 16 and profile 18 are relatively small, is eliminated.

[0011] Finally, in step 110, flange 16 and profile 18 are stripped from carrier web 20 at the stripping point 36. The stripping point 36 is in the general area of carrier web 20 where the path of carrier web 20 turns about stripping roller 28. Flange 16 and profile 18, after being stripped from carrier web 20, are guided through top take-off roller 32 and bottom take-off roller 34 for further processing, such as rolling and storing, shipping or application to a substrate.

[0012] It will be appreciated that flange 16 and profile 18 will be supported by carrier web 20 while flange 16 and profile 18 are in an unsolidified and relatively unstable state. It will be further appreciated that while flange 16 and profile 18 are in such an unsolidified and relatively unstable state, the apparatus 10 does not impart tensile forces to deform flange 16 or profile 18. As carrier web 20 provides a stable base for flange 16 and profile 18 during setting, postextrusion forming of the profile 18 or forming a relatively small unsupported flange 16 and profile 18 is possible. Finally, because carrier web 20 does not form an integral part of the finished product, no material is lost in the process, thereby reducing costs.

[0013] Advantageously, flange 16 is formed to a thickness of 2 to 8 mils (0.05 to 0.2mm), compared with tra-

ditional zipper components having a flange thickness of at least 6 mils (0.15mm). By forming flange 16 with a thickness of, for example, 2 mils (0.05mm), the temperature required for fusing flange 16 to a substrate, such

5 as a bag film, not shown, is reduced from approximately
280°F (138°C) for a typical 6 - 8 mils (0.15 to 0.2mm)
thickness flange 16 to approximately 245°F (118°C) for
a 2 mils (0.05mm) thickness flange 16 formed in accord-
10 ance with the present method. By reducing the fusing
temperature of the flange 6, the speed of fusing the zip-
per component is thereby increased. Similarly, the zip-
per component formed according to the method of the
present invention eliminates the need to pre-soften or
stamp the zipper for side sealing effectiveness since
15 less material is available to soften and act as a heat sink
than traditional zipper components.

[0014] As described above, flange 16 is first deposited onto the top surface of carrier web 20, and profile 18 is then deposited onto the top surface of flange 16. Alternatively, flange 16 and profile 18 may be extruded and deposited onto the surface of carrier web 20 simultaneously, either as discrete components or as a single component, or a so-called string zipper.

[0015] In the above description, a single profile 18 is depicted on flange 16. If desired, such as for applications as described in the aforementioned US-A-4,894,975, a pair of mating profiles 18 could be deposited in parallel relationship onto the same flange 16 to provide a zipper tape. Thus, a male profile 18 and female profile 18' could both be deposited onto flange 16 as shown in Figure 3, wherein the optional profile 18' is shown in phantom.

35 Claims

1. A method of forming a zipper component, comprising the steps of:

40 extruding at least one profile (16, 18);
 depositing said at least one profile (16, 18) onto
 a top surface of a carrier web (20), said carrier
 web (20) being formed in an endless loop;
 stripping said at least one profile (16, 18) from
 said carrier web (20) after said at least one pro-
 file (16, 18) has set.
 2. A method according to claim 1, comprising the fur-
 ther steps of:

50 extruding a flange (16) prior to extruding said
 at least one profile (18); and,
 depositing said flange (16) directly onto said
 top surface of said carrier web (20);
 wherein said at least one profile (18) is then de-
 posited onto a top surface of said flange (16).
 3. A method according to claim 2, comprising the fur-

ther steps of:

extruding another profile (18'), said another profile having a mating configuration to said at least one profile (18);

5

depositing said another profile (18') onto said top surface of said flange (16) in parallel relationship with said at least one profile (18); and, carrying out said stripping step after said flange (16), said at least one profile (18) and said another profile (18') have set.

10

4. A method according to claim 2 or 3, wherein said at least one profile (18,18') and said flange (16) are formed of different polymeric resins. 15
5. A method according to claim 2, 3 or 4, wherein said flange (16) has a thickness of 2 to 8 mils (0.05-0.2mm). 20
6. A method according to claim 2, 3, 4 or 5, comprising the further step of extruding a sealant onto at least one surface of said flange (16) or profile (18,18').
7. A method according to any one of the preceding claims, further comprising the step of cooling said at least one profile (18,18') and/or the flange (16) with water after the step of depositing said at least one profile (18,18'). 25
8. A method according to any one of the preceding claims, further comprising the step of applying a release agent to said top surface of said carrier web (20) before the step of depositing said at least one profile (18,18') or flange (16). 30
9. A method according to any one of the preceding claims, further comprising the step of changing the temperature of said carrier web (20) in at least one location to facilitate adhesion of said at least one profile (18,18') or flange (16) to said carrier web, or to facilitate release of said at least one profile (18,18') or flange (16) from said carrier web during the stripping step. 35
10. A method according to any one of the preceding claims, wherein said top surface of said carrier (20) web has a non-smooth texture and wherein said texture is imparted to a bottom surface of said at least one profile (18,18') or flange (16). 40

45

50

55

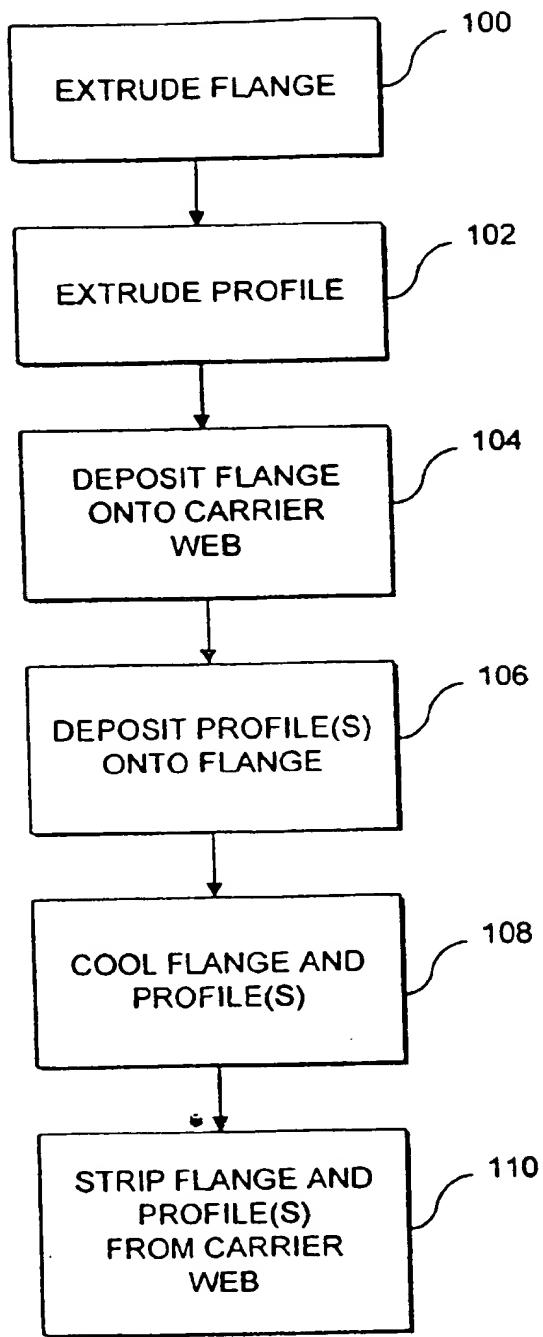


FIG. 1

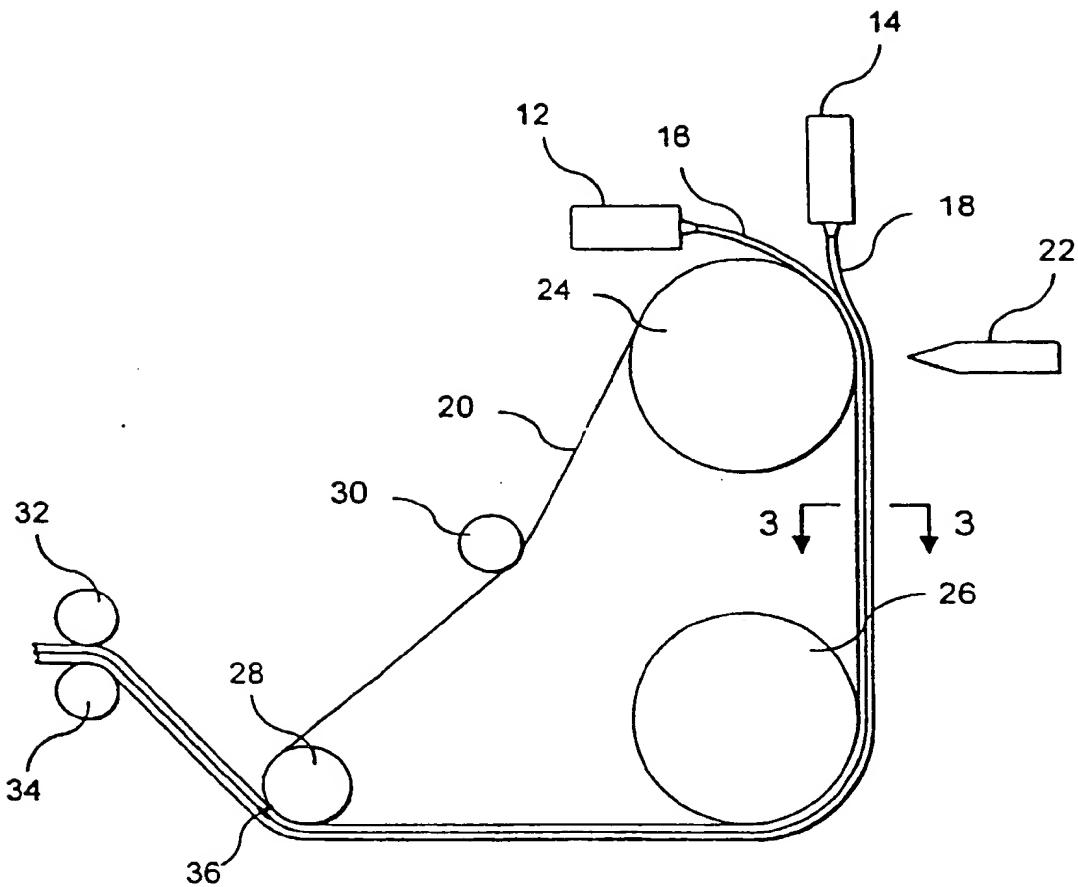


FIG. 2

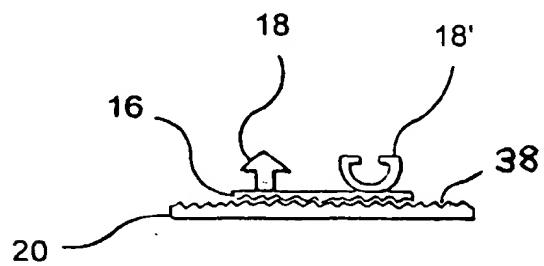


FIG. 3

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11)



EP 0 908 294 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
22.11.2000 Bulletin 2000/47

(51) Int Cl.7: B29D 5/00, B31B 19/90,
B65D 33/25

(43) Date of publication A2:
14.04.1999 Bulletin 1999/15

(21) Application number: 98308050.8

(22) Date of filing: 02.10.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE

Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 06.10.1997 US 944480

(71) Applicant: ILLINOIS TOOL WORKS INC.
Glenview, Illinois 60025 (US)

(72) Inventor: Plourde, Eric P.
Tinley Park, Illinois 60477 (US)

(74) Representative: Rackham, Stephen Neil
GILL JENNINGS & EVERY,
Broadgate House,
7 Eldon Street
London EC2M 7LH (GB)

(54) Zipper component

(57) An zipper component is formed by extruding a flange (16) and, depositing it onto the top surface of a continuous carrier web (20), extruding a profile (18,18')

and, depositing it onto the top surface of the flange (16), cooling the flange (16) and profile (18,18') and stripping the flange (16) and profile (18,18') from the carrier web for further processing.

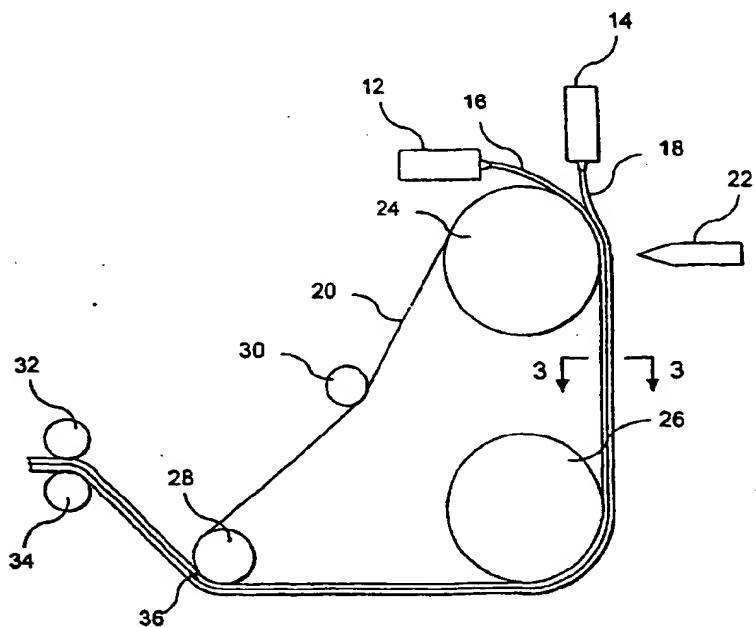


FIG. 2

EP 0 908 294 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 30 8050

DOCUMENTS CONSIDERED TO BE RELEVANT									
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)						
X	US 4 056 593 A (DE NAVAS ALBAREDA JOSE LUIS) 1 November 1977 (1977-11-01) * page 1, line 51 - line 62; figures 1,2 *	1	B29D5/00 B31B19/90 B65D33/25						
Y	EP 0 640 468 A (ILLINOIS TOOL WORKS) 1 March 1995 (1995-03-01) * column 2, line 52 - column 4, line 8; figures 2,4 *	2-4,6-8 ---							
Y	US 4 696 779 A (WIDEMAN RONALD H) 29 September 1987 (1987-09-29) * column 3, line 1 - line 36 * * column 5, line 21 - line 29 * * column 6, line 43 - column 7, line 13 * * claims 1-5; figures 1,2 *	7,8							
A	US 5 011 642 A (WELYGAN DENNIS G ET AL) 30 April 1991 (1991-04-30) * column 2, line 24 - line 39 * * column 4, line 25 - line 28 * * column 8, line 42 - line 52 * * column 9, line 56 - column 10, line 18; figure 3 *	10 7							
A	US 2 536 048 A (WILLIAM F. FLANAGAN) 2 January 1951 (1951-01-02) * column 2, line 3 - line 34 *	1,2,4,5, 7 9	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B29C B29D						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search:</td> <td style="width: 33%;">Date of completion of the search:</td> <td style="width: 34%;">Examiner:</td> </tr> <tr> <td>THE HAGUE</td> <td>3 October 2000</td> <td>Fageot, P</td> </tr> </table> <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background D : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>				Place of search:	Date of completion of the search:	Examiner:	THE HAGUE	3 October 2000	Fageot, P
Place of search:	Date of completion of the search:	Examiner:							
THE HAGUE	3 October 2000	Fageot, P							

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 8050

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
 The members are as contained in the European Patent Office EDP file on
 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

03-10-2000

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 4056593	A	01-11-1977		ES 389609 A AT 333222 B AU 470856 B AU 4011072 A BE 780656 A CA 982770 A CH 530187 A DE 2213686 A FR 2130514 A GB 1388567 A LU 64946 A NL 7203976 A,B, SE 395347 B AR 206583 A AT 209872 A CS 193467 B DK 134137 B FI 54686 B IE 36176 B IL 38976 A IT 953972 B JP 53022889 B MX 3114 E MY 23578 A NO 130294 B YU 66572 A ZA 7201731 A	16-12-1971 10-11-1976 20-09-1973 20-09-1973 03-07-1972 03-02-1976 15-11-1972 05-10-1972 03-11-1972 26-03-1975 07-07-1972 28-09-1972 15-08-1977 06-08-1976 15-03-1976 31-10-1979 20-09-1976 31-10-1978 01-09-1976 31-03-1976 10-08-1973 11-07-1978 18-04-1980 31-12-1978 12-08-1974 31-08-1982 27-12-1972
EP 0640468	A	01-03-1995		CA 2129405 A	28-02-1995
US 4696779	A	29-09-1987		NONE	
US 5011642	A	30-04-1991		US 4828902 A BR 8802693 A CA 1296855 A DE 3874415 A DE 3874415 T EP 0294209 A ES 2034228 T HK 66294 A JP 1008017 A JP 2599760 B KR 9602711 B SG 64394 G	09-05-1989 27-12-1988 10-03-1992 15-10-1992 08-04-1993 07-12-1988 01-04-1993 15-07-1994 12-01-1989 16-04-1997 26-02-1996 14-10-1994
US 2536048	A	02-01-1951		GB 692888 A	